

US LHC Accelerator Research Program  
Task Sheet

**Task Name:** 2.4.1.4 Cable Test

**Date:** 6/26/06  
**Revised:** 6/28/06

**Task Leader:** Arup Ghosh (BNL)

**Collaborating Institutions:** BNL, FNAL, LBNL

**Total Budget:** FY07 107 k\$

**Budget break down by Lab:**

FY07	FNAL	LBNL
M&S	2.5 k\$	21 k\$
Labor	35.1 k\$	42.4 k\$
Travel	7.5 k\$	6.0 k\$
Total	45 k\$	69.4 k\$

**Main Objectives and Features:**

- This Materials sub-program will organize and conduct tests of samples of TQ cable fabricated from RRP 54/61 wire, at cryogenic temperatures. The main goal is to check the degradation of critical currents of the TQ cable under transverse pressure and to compare with strand measurements conducted under Cable R&D task. The main tasks are:
  1. Test cable at the FRESCA facility at CERN under nominal pressure at 4.2 and 1.9K
  2. Test cable under variable transverse pressure at the High Magnetic Field Lab at Tallahassee, FL.

**Schedule, Distribution of Effort, Work Plan:**

Test at CERN

This activity is a collaboration between LARP and CERN. G. Ambrosio of FNAL will lead this effort and will collaborate with A. Verweij of CERN. The plan would be to modify existing tooling and assemble two samples of TQ cable, react and then impregnate with epoxy. The sample holder would be shipped to CERN and the cable tested with 35 MPa of transverse pressure. Maximum field of test will be 10T. Operating

cost of the test at the FRESKA facility will be borne by CERN. A test at CERN will provide a full characterization ( $I_c$  at high fields and stability at low fields) at 4.3K and 1.9K.

Following a first test, the cable samples would be stressed to 150-200 MPa at room temperature in a suitable press. It would again be tested with a nominal transverse pressure of 35 MPa to determine whether the high stresses have led to any irreversible degradation.

The first test would be concluded by Nov-06.

If these tests are meaningful, then it would be followed by another series of tests to either check reproducibility or a sample with a different strand.

The budget shown is for tooling modification, sample preparation and travel cost for a scientist to CERN for *two test campaigns*.

#### Test at NHMFL

D. Dietderich of LBNL will lead this effort. The plan is to use existing tooling at LBNL to test a pair of TQ cable samples in the 11T split-pair solenoid. In this test, the transverse pressure is applied at 4.2K and can be varied from a nominal pressure of 50 to 200 MPa.

The budget includes the cost of sample preparation, sample test (including the cost of liquid helium) and analysis. The budget requested is for *three test campaigns* including travel cost for one scientist.

The first test would be done towards the end of Nov-06.

**Status of LARP orders as of 6-02-06:**

Order Date	Ship Date	Adjusted Ship Date	Quantity	Completed	PO	Program	Billets
11/7/2005	7/2/2006	3/30/2006	90	37.4	6803608	LARP	8781
				16.1			8817
				36.5			8857
1/20/2006	9/6/2006	9/6/2006	90		6804489	LARP	
2/23/2006	11/30/2006	10/25/2006	90		6805346	LARP	
5/31/2006	10/31/2006		30			LARP	
			<b>300</b>	<b>LARP</b>			